

CHAPTER 103
SANITARY LANDFILLS

[Prior to 7/1/83, DEQ Ch 28]

[Prior to 12/3/86, Water, Air and Waste Management [900]]

567—103.1(455B) Scope and applicability. This chapter details the plan and operating requirements for all sanitary landfills. There are general requirements applicable to any type of sanitary landfill, and specific requirements for each of the types of sanitary landfills classified by the department. All sanitary landfills must conform with the provisions of 567—Chapter 102 of these rules, the general requirements set out in 103.2(455B), and the specific requirements set out in this chapter for the type of sanitary landfill to be established.

567—103.2(455B) General requirements for all sanitary landfills.

103.2(1) Plan requirements. The plans for all sanitary landfills shall include the following:

a. The map and aerial photograph required in 567—subrule 102.12(3) shall be of sufficient scale to show all homes, buildings, lakes, ponds, watercourses, wetlands, dry runs, rock outcroppings, roads and other applicable details including topography and drainage patterns. All wells shall be identified on the map or aerial photograph and a bench mark shall be indicated.

b. A plot drawing in appropriate scale of the site and the immediately adjacent area showing dimensions, topography with appropriate contour intervals, drainage patterns, known existing drainage tiles, locations where any geologic samples were taken, all water wells with their uses, and present and planned pertinent features including but not limited to roads, fencing, and cover stockpiles.

c. Detailed engineering drawing of the site showing all initial and permanent roads, buildings and equipment to be installed; unloading and holding areas; fences and gates; landscaping and screening devices; personnel and maintenance facilities; sewer and water lines.

d. A liner system that meets the following requirements, depending upon the type of waste material disposed:

(1) Municipal solid waste landfills (MSWLFs) shall have a composite liner system consisting of two components. The upper component must consist of a minimum 30-mil flexible membrane liner (FML), and the lower component must consist of at least a two-foot layer of compacted soil as specified in subparagraph 103.2(1) “d”(2). FML components consisting of high-density polyethylene (HDPE) shall be at least 60-mil thick. The FML must be installed in direct and uniform contact with the compacted soil component.

The requirements for MSWLF facilities under this subparagraph are effective November 13, 1996, and apply to liner and cover systems that have not been installed by that date.

(2) Nonmunicipal solid waste landfills may utilize a liner system meeting 103.2(1)“d”(1) or shall have a soil liner consisting of at least four feet of recompacted soil. The description, source and volume of the material to be used for the landfill liner, including the method of installation, must be provided. The coefficient of permeability must be 1×10^{-7} cm/sec (0.00028 ft/day) or less as determined by appropriate laboratory analysis. The percent of standard or modified proctor density at moisture contents consistent with expected field conditions and corresponding to a measured coefficient of permeability equal to or less than 1×10^{-7} cm/sec shall be determined in the laboratory. The soil shall be placed in lifts not to exceed 8 inches in thickness. A minimum of one field density test shall be performed per lift per acre to verify that the density determined by the laboratory analysis as correlated to permeability has been achieved. Results of field density tests shall be submitted to the department prior to the placement of solid waste.

e. Alternative liner systems:

(1) The department may approve an alternative to the liner system specified in subparagraph 103.2(1)“d”(1) provided that the alternative liner system design has included certification by a professional engineer registered in Iowa stating that the proposed alternative liner system will ensure that the contaminant concentration values listed in federal regulations under 40 CFR 258, Subpart D, Table 1, will not be exceeded in the uppermost aquifer at the designated monitoring points of compliance as specified by the department. This point of compliance shall be no more than 150 meters from the waste management boundary.

This point of compliance is to be utilized for the purpose of certifying the alternative design only. All operational issues related to monitoring systems, compliance determinations, groundwater assessments, and remedial measures are governed by the appropriate relevant sections in 567—Chapter 103 and 567—Chapter 111. The certification shall be on a form furnished by the department which shall include space for identification of the sources of data utilized; formulas, models, tests or other methods utilized to determine contaminant concentrations at the points of compliance; and all references or guidance documents relied upon for the techniques or methods applied. A copy of all data utilized, formulas, models, tests or other methods utilized to determine contaminant concentrations at the point of compliance shall be placed in the facilities’ official files prior to operation of the landfill.

(2) An alternative liner system to that required in subparagraph 103.2(1)“d”(2) may be approved by the director if the design of the liner system is equivalent to the soil liner required in subparagraph 103.2(1)“d”(2) in performance, longevity and protection of the groundwater; or based on the specific type of waste to be disposed, the design of the liner system offers equivalent protection of the groundwater. Undisturbed soil will not be allowed for use as liner material.

f. Diversion and drainage structures designed to prevent ponding, infiltration, inundation, erosion, slope failure and washout from surface runoff due to a 25-year, 24-hour rainfall event, as shown in the Department of Agriculture publication “Climatology of Iowa Series #2-1980.”

g. A leachate collection, storage and treatment and disposal system designed to protect the soils, surface water, and groundwater from leachate contamination. This system shall be designed to operate during the active life of the site and during the postclosure period required by Iowa Code section 455B.304.

(1) The design and construction of the system must be in accordance with subrule 103.2(3) and be coordinated with the planned phase development of the site and the timing of leachate generation.

(2) The potential for leachate generation shall be evaluated in determining the design for the facility.

(3) The plan must include proposed quality assurance and quality control testing to be performed during installation and operation of the system. This shall include procedures that will be followed during installation of the leachate collection system, and during normal landfill operations to ensure the system's integrity and design standards.

h. A drawing of the scheme of development including any excavation, trenching, and fill shown progressively with time. The methods to be used to ensure compliance with the scheme and to provide vertical and horizontal controls shall be described.

i. Cross-sectional drawings showing progressively with time the original and proposed elevation of excavating, trenching, and fill.

j. Evidence that the proposed plan has been reviewed by the local soil conservation district commissioner and that the technical assistance of the soil conservation district will be utilized to facilitate compliance with wind and water soil loss limit regulations provided for in Iowa Code sections 467A.42 to 467A.51.

k. An ultimate land use proposal, including intermediate stages, with time schedules indicating the total and complete land use. Final elevations, grades, permanent drainage structures, monitoring or treatment facilities and permanent improvements of the completed landfill shall be included. Any supporting drawings to the ultimate land use proposal shall be in appropriate scale.

l. Information describing:

(1) Source, volume, and characteristics of cover material

(2) Area of site in acres

(3) Areas to be used for salvaging and the burning of diseased trees.

m. A report consisting of information verifying that the portion of the site to be filled is:

(1) So situated as to obviate any predictable lateral movement of significant quantities of leachate from the site to standing or flowing surface water or to shallow aquifers that are in actual use or are deemed to be of potential use as a water resource.

(2) So situated that the base of the proposed site is at least 5 feet above the high water table unless a greater separation is required to ensure that there will be no significant adverse effect on ground or surface waters or a lesser separation is unlikely to have a significant adverse effect on ground and surface waters.

(3) Outside a flood plain or shoreland, unless proper engineering and sealing of the site will render it acceptable and prior approval of the department under Title V of these rules and where necessary the U.S. Corps of Engineers is obtained.

(4) So situated to ensure no adverse effect on any well within 1000 feet of the site existing at the time of application for the original permit which is being used or could be used without major renovation for human or livestock consumption or at least 1000 feet from any such well unless hydrologic conditions are such that a greater distance is required to ensure there is no adverse effect on the well.

(5) So situated to ensure no adverse effect on the source of any community water system in existence at the time of application for the original permit within one mile of the site or at least one mile from the source of any community water system in existence at the time of application for the original permit unless hydrologic conditions are such that a greater distance is required to ensure no adverse effect on the water system.

(6) At least 20 feet from the adjacent property line unless there is a written agreement with the owner of the abutting property. For new permit applications and associated report submitted after April 27, 1977, the report shall verify that the portion to be filled is at least 50 feet from the adjacent property line. The written agreement shall be filed with the county recorder and shall become a permanent record of the property.

(7) Beyond 500 feet from any existing habitable residence unless there is written agreement with the owner of the residence and the site is screened by natural objects, plantings, fences or by other appropriate means. The residence must be in existence on the date of application for the original permit from the department. The written agreement shall be filed with the county recorder and recorded for abstract of title purposes, and a copy submitted to the department.

n. Should conditions in violation of 103.2(1)“i”(1), (2), (3), (4), or (5) exist, the original plan shall detail how the site is to be engineered to provide equivalent protection to the water resources. The applicant shall have the burden of showing that equivalent protection will be provided.

o. If sewage sludge is to be disposed at the site, the characteristics of the sludge and the method of disposal shall be described. If sludge is to be utilized for land application, it shall be in conformance with 567—Chapter 67.

p. The required soil and hydrogeologic design information specified in 567—Chapter 110.

q. Such additional data and information as may be deemed necessary by the director to evaluate a proposed sanitary landfill.

r. When a new landfill or lateral expansion is located within 10,000 feet of any airport runway end used by turbojet aircraft or within 5,000 feet of any airport runway end used by only piston-type aircraft, the plan must contain a notice that the facility's official files will include the following demonstration: that the site is designed and will be operated so that it does not pose a bird hazard to aircraft. For any new site or a lateral expansion within a five-mile radius of any airport runway end used for turbojet or piston-type aircraft, the plan must show that the Federal Aviation Administration has been notified. For existing landfills located within 10,000 feet of any airport runway end used by turbojet aircraft or within 5,000 feet of any runway end used by only piston-type aircraft, the owner or operator must prepare the demonstration required above in this paragraph and notify the director that it has been placed in the facility's official files.

s. When a new landfill or lateral expansion is located within 200 feet of a fault that has had displacement in holocene time, the plan must contain a notice that the facility's official files will include the following demonstration: that an alternative setback distance of less than 200 feet will prevent damage to the structural integrity of the site and will be protective of human health and the environment.

t. When a new landfill or a lateral expansion is located in seismic impact zones, the plan must contain a notice that the facility's official files will include the following demonstration: that all containment structures, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in the lithified earth material for the site.

u. When a new facility or lateral expansion is located in an unstable area, the plan must contain a notice that the facility's official files will include the following demonstration: that engineering measures have been incorporated into the site design to ensure that the integrity of the structural components of the site will not be disrupted. The demonstration must consider the on-site or local soil conditions that may result in significant differential settling, on-site or local geologic or geomorphologic features, and on-site or local human-made features or events (both surface and subsurface). For existing facilities located in an unstable area, the owner or operator must prepare the above demonstration required in this paragraph and notify the director that it has been placed in the facility's official files.

103.2(2) *General operating requirements for all sanitary landfills.* All sanitary landfills shall be operated in conformance with this subrule. The plan submitted shall detail how the sanitary landfill will comply with these requirements.

a. Solid waste shall be unloaded at the operating area only when an operator is on duty at that area. Solid waste may be deposited in storage containers inside the site under the supervision of an attendant or operator.

b. Access to the site shall be restricted and a gate shall be provided at the entrance to the site and kept locked when an attendant or operator is not on duty.

c. A copy of the permit, engineering plans and reports shall be kept at the site at all times unless, the applicant demonstrates to the department that, on the basis of the characteristics of the waste to be handled at the site and the times of operation of the site, such is unnecessary.

d. Sites not open to the public shall have a permanent sign posted at the site entrance specifying:

- (1) Name of operation.
- (2) The site permit number.
- (3) That the site is not open to the public.
- (4) The name and telephone number of the responsible official.

e. Solid waste shall not be deposited in such a manner that material or leaching therefrom may cause pollution of ground or surface waters.

f. Provision shall be made for an all-weather fill area which is accessible for solid waste disposal during all weather conditions under which solid waste is received and disposed of at the site. Such all-weather areas shall be operated at all times in accordance with Iowa Code chapter 455B and these rules.

g. Provisions shall be made to have cover material available for winter and wet weather operations.

h. Each site shall be graded and provided with drainage facilities to meet the requirements of 103.2(1) "f" to minimize flow of surface water onto and into the portion of the site being filled, and to prevent soil erosion and ponding of water.

i. The finished surface of the site shall be repaired as required, covered with soil, and seeded with native grasses or other suitable vegetation immediately upon completion or promptly in the spring on areas terminated during winter conditions. If necessary, seeded slopes shall be covered with straw or similar material to prevent erosion.

j. Each sanitary landfill shall be staked as necessary and inspected annually or as otherwise specified in the permit, by a professional engineer registered in Iowa. A brief report by the engineer indicating areas of conformance or nonconformance with the approved plans and specifications shall be submitted to the department by the permit holder within 30 days of the inspections. In specifying alternate inspection frequencies the department shall consider the types and quantities of waste disposed of, the rate of development of the site, the degree of control over site development inherent in the design and topography of the site and the quality of prior operation.

k. If any pockets, seams or layers of sand or other highly permeable material are encountered at the sanitary landfill, the permit holder shall promptly notify the department and shall ensure that a professional engineer registered in Iowa has certified that all sands encountered were totally excavated or sealed off properly or otherwise handled as explicitly provided for in the permit before solid waste is disposed in that area of the site.

l. The total volume of leachate collected for each month shall be recorded, and the elevation of leachate in the landfill shall be provided to the department in accordance with the schedule specified in the permit.

103.2(3) Hydrologic monitoring system. The owner or operator of a solid waste disposal facility shall operate and maintain a hydrologic monitoring system which includes a sufficient number of groundwater monitoring wells and surface water monitoring points to determine the impact, if any, that the sanitary disposal project is having on the adjacent water. The hydrologic monitoring systems shall enable early detection of the escape of pollutants from a sanitary landfill.

The hydrologic monitoring system shall be planned, designed and constructed in accordance with the provisions of 567—Chapter 110, and implemented in accordance with the following schedule:

a. A hydrologic monitoring system plan shall be submitted to the department for review and approval with any application for a new permit. Installation of the approved system shall be completed prior to the deposition of solid waste into the landfill.

b. A hydrologic monitoring system plan shall be submitted with applications for permit renewal, not later than the date of renewal, with completion of installation and operation within one year of approval of the plan. However, an existing landfill with a date of renewal occurring after the effective date of these rules (June 21, 1989) but prior to July 1, 1990, shall submit a hydrologic monitoring system plan by July 1, 1990. Installation of the plan shall be completed within one year of the date of departmental approval.

c. Upon notice of the department, a hydrologic monitoring system plan may be required to be submitted within six months of such notification, with completion of installation and operation of the approved plan within one year of the date of departmental approval.

103.2(4) Hydrologic monitoring system operating requirements.

a. *Operational sampling requirements.* All sampling shall be conducted in accordance with an approved sampling protocol, components of which are described in rule 567—110.8(455B).

b. Groundwater levels. The elevation of water in each monitoring well shall be measured monthly and recorded to the nearest 0.01 foot. Level measurements must be made before a well is evacuated for sample collection.

c. Surface water levels. The water level or flow rate of each surface water body sampled shall be measured and recorded at the time of sample collection.

d. First-year water sampling. During the first year of operation of the hydrologic monitoring system, samples shall be collected quarterly from each groundwater monitoring well and surface water monitoring point. The purpose of this sample is to determine baseline water quality information and enable initial estimation of water quality variability. Samples shall be analyzed for the following parameters in addition to the parameters listed in paragraph "e" of this subrule, plus any additional parameter deemed necessary by the department.

1. Arsenic, dissolved.
2. Barium, dissolved.
3. Cadmium, dissolved.
4. Chromium, total dissolved.
5. Lead, dissolved.
6. Mercury, dissolved.
7. Magnesium, dissolved.
8. Zinc, dissolved.
9. Copper, dissolved.
10. Benzene.
11. Carbon tetrachloride.
12. 1,2-Dichloroethane.
13. Trichloroethylene.
14. 1,1,1-Trichloroethane.
15. 1,1-Dichloroethylene.
16. Paradichlorobenzene.

e. Routine semiannual water sampling. After the first year, each monitoring point must be sampled semiannually as specified in the facility's operation permit and analyzed for the following parameters.

1. Chloride.
2. Specific conductance (field measurement).
3. pH (field measurement).
4. Ammonia nitrogen.
5. Iron, dissolved.
6. Chemical oxygen demand.
7. Temperature (field measurement).
8. Any additional parameters deemed necessary by the department.

f. Routine annual water sampling. One sample per year from each monitoring point collected in a quarter specified in the facility's operation permit must be analyzed for the following parameters.

1. Total organic halogen.
2. Phenols.
3. Any additional parameters deemed necessary by the department.

103.2(5) *Laboratory procedures.* The owner or operator of the solid waste facility must have the groundwater and surface water samples analyzed only by laboratories that are certified by the state of Iowa. Until the department adopts rules regarding certification of laboratories, analyses shall be conducted at a laboratory that certifies to the department that the appropriate analytical procedure is utilized.

All analyses of parameters not covered in the Safe Drinking Water Act (SDWA) must be performed according to methods specified in SW-846 or approved by the United States Environmental Protection Agency. Any analytical method used on non-SDWA parameters deviating from those specified in SW-846 or approved by EPA must be approved by the department.

All analyses must be recorded on forms which, in addition to the analytical results, show the precision of the data set, bias, and limit of detection.

103.2(6) *Analysis of sampling data.* For each parameter analyzed during the first year of operation of the hydrologic monitoring system, as listed in paragraph 103.2(4)“d” above, determine the mean and standard deviation for each upgradient monitoring well using the first year of data. For routine semiannual monitoring parameters, as listed in paragraph 103.2(4)“e” above, mean and standard deviation should be recalculated annually using all available analytical data.

If the analytical results for a downgradient monitoring point do not fall within the control limits of two standard deviations above the mean parameter(s) level in a corresponding upgradient monitoring point, the owner or operator shall submit this information to the department within 30 days of receipt of the analytical results. If the analytical results from an upgradient monitoring point do not fall within two standard deviations of the mean parameter(s) level for that monitoring point, the department shall also be notified within 30 days.

103.2(7) *Additional sampling.* The department will determine if additional sampling is warranted, after receipt of information indicating a possible release as required in subrule 103.2(6) above. The department may require any additional samples to be split and analyzed to determine if the values obtained outside the control limits were the result of laboratory or sampling error. Any additional analytical results shall be submitted to the department by the owner or operator within seven days of receipt. The department will review the information and determine if additional monitoring or preparation of a groundwater quality assessment plan, in accordance with subrule 103.2(9), is necessary.

103.2(8) *Record keeping and recording.*

a. The persons conducting the sampling must record the procedures, measurements, and observations at the time of sampling. The field records must be sufficient to document whether the procedures and requirements specified in the sampling protocol have been followed. The records must also contain the names of the persons conducting the sampling, the time and date each monitoring point was sampled, the required field measurement or test result. The owner or operator must submit copies of these field records to the department if requested.

b. The owner or operator shall keep records of analyses and the associated groundwater surface elevations for the active live and postclosure period of the facility. These records shall be kept at the site or in the administrative files of the owner or operator, and shall be available for review by the department upon request in the county in which the landfill is located.

c. The owner or operator shall provide the department with copies of the quarterly monitoring analytical results by the dates specified in the facility's operation permit.

d. An annual report summarizing the effect the facility is having on groundwater and surface water quality shall be submitted to the department by November 30 each year. The summary is to be prepared by an engineer registered in the state of Iowa and incorporated in the November semiannual engineer inspection report. The contents of this summary are to include the following items:

1. Amounts and kinds of wastes accepted under Special Waste Authorizations.
2. A narrative describing the effects the facility is having on surrounding surface water and groundwater quality and any changes made or maintenance needed in the monitoring network.
3. Graphs showing concentrations versus time for all monitoring parameters for each well for as long as records exist for that parameter. Control limits (— two standard deviations from the initial background value) must be shown in each graph.
4. Results of activities and tests required by the well maintenance and performance reevaluation plan described in 567—110.9(455B) shall be submitted to the department.

103.2(9) Groundwater quality assessment plan.

a. If leachate migration occurs, as required by the department, the owner or operator shall develop and submit for approval a specific plan to conduct a groundwater quality assessment study at the facility to determine the rate of migration and the extent and constituent composition of the leachate release. At a minimum, the assessment monitoring plan must contain the following elements:

1. Discussion of the hydrogeologic conditions at the site with an identification of potential contaminant pathways.
2. Description of the present detection monitoring system.
3. A description of the approach the owner or operator will take to substantiate any contention that the contamination may have been falsely indicated.
4. Description of the investigatory approach used to characterize the rate and extent of leachate migration.
5. Discussion of the number, location and depth of wells that will be initially installed as well as a strategy for installing more wells in subsequent investigatory phases.
6. Information on well design and construction.
7. Description of the sampling and analytical program used to obtain and analyze groundwater monitoring data.
8. Description of data collection and analysis procedures.
9. Schedule for the implementation of each phase of the assessment study.

b. After the plan has been approved by the department, the owner or operator shall implement the plan according to the schedule in the plan.

c. Within 90 days after the activities prescribed in the groundwater assessment plan have been completed, the owner or operator shall submit a written groundwater quality assessment report to the department.

d. If the department determines that no waste or waste constituents from the facility have entered the groundwater, the owner or operator shall reinstate the routine monitoring program.

If the department determines that waste or waste constituents have been released from the facility and have entered the groundwater, the owner or operator shall continue to make the determinations described by the assessment plan and develop a remedial action/mitigation plan to alleviate or reduce contamination to the fullest extent possible.

103.2(10) *Postclosure monitoring requirements.*

a. At least six months prior to closing the site, the owner or operator of a sanitary landfill shall submit a plan to the department for approval detailing a 30-year postclosure monitoring program.

b. The department will review the facility's postclosure monitoring records at five-year intervals to determine if changes in the monitoring frequencies or parameters are required.

c. The commission may adopt rules on a site-specific basis identifying additional monitoring requirements for sanitary landfills for which the postclosure monitoring period is to be extended.

103.2(11) *Leachate control systems for new landfills.* All new landfills must have a leachate collection, storage, and treatment and disposal system in place prior to accepting waste. This system shall be operated in conformance with the approved design during the active life of the site and during the postclosure period.

a. *Leachate collection system.*

(1) The leachate collection system shall be designed to allow not more than 1 foot of head above the top of the landfill liner. The collection system must include a method for measuring the leachate head in the landfill at the lowest area(s) of the collection system.

(2) The landfill liner must be graded toward the leachate collection pipe at a slope greater than 2 percent, but not to exceed 10 percent. The side slopes of the landfill liner must be less than 25 percent.

(3) A drainage layer must be placed immediately above the landfill liner. This drainage layer shall consist of a minimum of 1 foot of soil with a coefficient of permeability of 1×10^{-3} cm/sec (2.8 ft/day) or greater.

(4) Leachate collection pipe shall be placed in a trench excavated a minimum of 18 inches into the liner. The liner system beneath the trench shall meet the applicable requirements specified under 103.2(1) "d."

(5) Leachate collection pipe shall be surrounded by a gravel protection and drainage layer, and by either a graded filter layer or by a geotextile filter fabric.

(6) The collection pipe must be covered with a filter material to encourage flow and to prevent infiltration of fine-grained materials into the pipe. The collection pipe must be perforated or slotted, of a sufficient diameter to handle the expected flow, but not less than 4 inches in inside diameter, capable of being cleaned throughout the active life of the site and during the postclosure period, chemically resistant to the wastes and the expected leachate and of sufficient strength to support maximum static and dynamic loads imposed by the overlying wastes, cover materials, and equipment used during the construction and operation of the site. Documentation shall be submitted which includes methods and specifications for cleaning of the pipes, chemical compatibility of the pipes, and calculations and specifications for pipe strength.

(7) The leachate collection system shall be equipped with valves to enable the flow of leachate from the facility to be shut off during periods of maintenance.

(8) The leachate collection system shall be cleaned out once every three years, or more frequently if leachate head or the volume of leachate collected indicates cleanout is necessary. A report of the methods and results of the cleanout shall be submitted at the time of permit renewal.

b. Leachate storage system. The leachate storage system must be:

- (1) Capable of storing at least seven days' accumulation of leachate based on mathematical simulated volume using average precipitation; and
- (2) Constructed of materials which are compatible with the expected leachate; and
- (3) Accessible at all times of the year and under all weather conditions.

c. Leachate treatment and disposal system.

(1) Leachate shall be treated by such physical, chemical or biological processes as necessary to meet the pretreatment limits, if any, imposed by a treatment agreement between the landfill and a publicly owned treatment works, or by the effluent discharge limitation established by an NPDES permit issued to the landfill.

(2) Leachate recirculation systems shall be designed to minimize detrimental effects to vegetative cover, minimize erosion and damage to the soil cover, and to promote rapid stabilization of the waste. Such systems shall not be allowed for sites which do not satisfy all of the requirements of 103.2(11).

(3) All leachate treatment systems, except as described in (2) above, shall conform to wastewater treatment design standards as established by the department.

d. Inspection prior to start-up. The department shall be notified when the initial construction of the leachate collection, storage, and treatment and discharge systems have been completed, in order that an inspection may be made to determine that the leachate control system is constructed as designed. Prior to this inspection, construction certification reports from the project engineer must be submitted discussing quality assurance and quality control testing done to ensure that all materials and equipment for the leachate control system have been placed in accordance with the approved engineering plans, reports and specifications. The results of all testing must be included, along with documentation of any failed tests, a description of the procedures used to correct the failures, and results of any retesting performed. This inspection may be incorporated with the inspection required by rule 567—102.11(455B).

103.2(12) *Leachate control systems for existing landfills.*

a. All existing landfills must submit a leachate control plan, as described in paragraph “*b*” below when any of the following occur:

- (1) At the time of permit renewal;
- (2) When requesting a change in the existing permit for expansion or modification of the waste fill area;
- (3) Within 180 days of notification by the department of the detection of any leachate seep or contamination of the groundwater or surface waters from leachate; or
- (4) At least 180 days prior to landfill closure.

The leachate control plan must be submitted no later than July 1, 1991.

b. The design of the leachate control system must include leachate collection storage, and treatment and disposal.

(1) New fill areas of a landfill that have not previously received waste must address the design standards of subrules 103.2(1) and 103.2(11).

(2) Existing fill areas must address the design standards of subrule 103.2(11), except paragraph "a," subparagraphs (1) to (4). The leachate collection system must be designed to achieve the lowest possible leachate head above the landfill liner, and must include a method of measuring the leachate head.

c. The leachate control plan must be implemented within one year of departmental approval of the leachate control plan, but no later than July 1, 1992.

103.2(13) Closure requirements. The owner or operator of the landfill must close the site in a manner that minimizes the potential for postclosure release of pollutants to the air, groundwater or surface waters.

a. A minimum of two permanent surveying monuments must be installed by a registered land surveyor from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the postclosure period.

b. The final cover of a nonmunicipal solid waste landfill shall consist of:

(1) Not less than 2 feet of compacted soil. The permeability must be 1×10^{-7} cm/sec or less as determined by appropriate laboratory analysis. The percent of standard or modified proctor density at moisture content consistent with expected field conditions and corresponding to a measured coefficient of permeability equal to or less than 1×10^{-7} cm/sec shall be determined in the laboratory. The soil shall be placed in lifts not to exceed 8 inches in thickness. A minimum of one field density test shall be performed per lift per acre to verify that the density determined by the laboratory analysis as correlated to permeability has been achieved. Results of field density tests shall be submitted to the department. The compacted soil shall be keyed into the bottom liner at the waste cell boundary.

(2) Not less than 2 feet of uncompacted soil, containing sufficient organic matter to support vegetation. The thickness of this soil layer must be at least the root depth of the planned vegetative cover to prevent root penetration into the underlying soil layers. This layer shall be placed as soon as possible to prevent desiccation, cracking and freezing of the compacted soil layer described in 103.2(13)"b"(1).

(3) A layer of compacted soil, incinerator ash, or similar material permitted by the department may be used to prepare the site for placement of the compacted soil layer described in 103.2(13)"b"(1). The use of such material will not serve as a replacement for the compacted soil layer described in 103.2(13)"b"(1).

(4) Alternate methods and materials may be permitted if shown to provide equal or superior performance.

c. The final cover for a municipal solid waste landfill shall consist of:

(1) An erosion layer underlain by an infiltration layer. The infiltration layer must be comprised of a minimum of 18 inches of earthen material that has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less. The erosion layer must consist of a minimum of 6 inches of earthen material that is capable of sustaining native plant growth.

(2) The department may approve an alternate final cover design that includes an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified above in subparagraph (1) and an erosion layer that provides equivalent protection from wind and water erosion as the erosion layer specified above in subparagraph (1).

d. Those portions of existing landfills demonstrating placement of final cover in conformance with previously approved plans and specifications or regulations in effect at the time of such approval shall not be required to apply additional cover solely to achieve compliance with 103.2(13) “*b*” and “*c*.” Those areas of existing landfills which have not been completed in conformance with the exemptions provided herein prior to the enactment of this subrule shall complete all such areas in conformance with an approved closure plan pursuant to 567—subrule 102.12(10) and which shall include compliance with the provisions of 103.2(13) “*b*” and “*c*.” This paragraph shall not preclude a requirement to provide additional cover to such exempted areas as a result of the conclusions of a groundwater assessment or remedial action plan.

e. The final cover shall be designed and graded to meet the drainage requirements of 103.2(1) “*f*.” The final cover must have a minimum slope of 5 percent, and shall not exceed a slope of 25 percent. Those portions of existing landfills demonstrating placement of final cover in conformance with previously approved plans and specifications shall not be required to reconstruct the cover to meet either the minimum or maximum slope established by this subrule. Those areas which have not been completed by placement of final cover pursuant to this exemption at the time of enactment of this subrule shall complete all such areas in conformance with an approved closure plan pursuant to 567—subrule 102.12(10) and which shall meet the minimum and maximum slope requirements stated herein. This subrule shall not preclude a requirement to modify the slope of any portion of the landfill as a result of the conclusion of a groundwater assessment or remedial action plan.

f. The final cover shall be seeded as soon as practical upon completion with native grasses or other suitable vegetation to prevent soil erosion. If seeding must be delayed due to summer or winter conditions, silt fences or other structures shall be used to minimize erosion of the final cover until the next season suitable for planting. The placement of cover in conformance with 103.2(13) “*b*” and “*c*” shall not be delayed due to season and shall be placed as soon as the solid waste has reached its maximum design elevation within the cell. Vegetation type shall be based on density and root depth, nutrient availability, soil thickness, and soil type. Alternatives to vegetative cover may be considered to control erosion and promote runoff.

g. An approved groundwater monitoring system as required by the closure permit and the rules must be in place and operating.

h. An approved leachate collection and treatment system as required by the closure permit and the rules must be in place and operating.

i. An approved landfill gas monitoring and collection or ventilation system as required by the closure permit and the rules must be in place or operating unless determined not to be necessary by the director.

j. An approved financial assurance instrument, adequate to cover costs of all postclosure activities as required by the closure plan and the closure permit, must be provided upon promulgation of the appropriate rules.

k. All requirements of the closure plan, the closure permit, and the rules must be satisfied.

103.2(14) *Postclosure requirements for 30 years following closure of the site.* The owner or operator of the site must comply with all postclosure requirements.

a. The diversion and drainage system as required in 103.2(1) “*f*” must be maintained to approved specifications to prevent run-on and runoff from eroding or otherwise damaging the final cover.

b. The integrity and effectiveness of the final cover must be maintained by making repairs as necessary to correct the effects of settling, subsidence, erosion, or other events. If damage to the compacted soil layer described in 103.2(11)“b”(1) occurs, repairs shall be made to correct the damage and return it to its original specifications.

c. The vegetative cover shall be reseeded as necessary to maintain good vegetative growth. Any invading vegetation whose root system could damage the compacted soil layer shall be removed or destroyed immediately.

d. The groundwater monitoring system shall be operated and maintained and shall comply with all applicable rules and closure permit requirements.

e. The leachate collection, removal and treatment systems shall be operated and maintained and shall comply with all applicable rules and closure permit requirements.

f. The landfill gas monitoring and collection systems shall be operated and maintained and shall comply with all applicable rules and closure permit requirements.

g. Semiannual reports shall be submitted to the department. These reports shall contain information concerning the general conditions at the site, groundwater monitoring results, amount of leachate collected and treated, information concerning the landfill gas monitoring and collection system, and other information as may be required by the closure permit. In addition, locations and elevations of all permanent monuments, required in 103.2(11)“a,” shall be determined at least once every three years or more frequently in the event of obvious disturbance of the monument. The reports are due by April 30 and October 31 for the preceding six-month period.

h. The permanent surveying monuments required in 103.2(11)“a” shall be maintained.

103.2(15) Explosive gases control.

a. Owners or operators of all sanitary landfills must ensure that:

(1) The concentration of methane gas generated by the facility does not exceed 25 percent of the lower explosive limit for methane in facility structures (excluding gas control or recovery system components); and

(2) The concentration of methane gas does not exceed the lower explosive limit for methane at the facility property boundary.

b. Owners or operators of all sanitary landfills must monitor quarterly for compliance with paragraph “a” of this subrule. An annual report shall be submitted by November 30 summarizing the methane gas monitoring results and any action taken resulting from gas levels exceeding the limits during the previous year.

c. If methane gas levels exceeding the limits specified in paragraph “a” of this subrule are detected, the owner or operator must:

(1) Immediately take all necessary steps to ensure protection of human health and notify the director;

(2) Within seven days after detection submit to the director a report stating the methane gas levels detected and a description of the steps taken to protect human health;

(3) Within 60 days of detection, implement a plan for remediation of the methane gas releases and send a copy of the remediation plan to the director. The plan shall describe the nature and extent of the problem and the proposed remedy.

103.2(16) Financial assurance. All municipal solid waste landfills must comply with the financial assurance requirements specified in 567—Chapter 111.

This rule is intended to implement Iowa Code section 455B.304.

567—103.3(455B) Specific requirements for a sanitary landfill proposing to accept all solid waste except toxic or hazardous waste.

103.3(1) Plan requirements. The plans for sanitary landfills proposing to accept all solid waste except toxic or hazardous waste shall include the following information in addition to that required by 567—Chapter 102 and subrule 103.2(1).

103.3(2) Specific operating requirements for sanitary landfills proposing to accept all solid waste except toxic or hazardous waste. Sanitary landfills accepting all solid waste shall be operated in conformance with 567—Chapter 102, subrule 103.2(2), and this subrule. The plan submitted shall detail how the sanitary landfill will comply with these requirements.

a. Immediately after solid waste is deposited, it shall be uniformly spread and compacted as densely as practicable in layers not exceeding 2 feet in depth and at an operating face slope which will permit thorough compaction into cells.

b. Solid waste at the site shall be covered after each day of operation with a compacted layer of at least 6 inches of earth.

c. At least 1 foot of intermediate cover of compacted earth shall be applied to any area of the site which will not be utilized for further disposal of solid waste for more than one week.

d. At least a 2-foot cover of compacted earth shall be applied to any area of the site which will not be utilized for further disposal of solid waste for more than two months. The cover shall be graded to allow surface water runoff.

e. The final cover shall be consistent with the proposed land use, but in no event shall be less than 2 feet.

567—103.4(455B) Specific requirements for a sanitary landfill proposing to accept only construction and demolition waste.

103.4(1) Plan requirements. The plans for sanitary landfills proposing to accept only construction and demolition waste shall include the following information in addition to that required by 567—Chapter 102 and subrule 103.2(1).

103.4(2) Specific operating requirements for sanitary landfills proposing to accept only construction and demolition waste. Sanitary landfills accepting only construction and demolition waste shall be operated in conformance with 567—Chapter 102, subrule 103.2(2), and this subrule. The plan submitted shall detail how the sanitary landfill will comply with these requirements.

a. Immediately after solid waste is deposited, it shall be uniformly distributed and compacted as densely as practical.

b. The waste shall be covered with a minimum of 1 foot of earth at least once every seven days of operation. The day during which cover will be applied shall be specified in the plan.

c. At least a 2-foot cover of compacted earth shall be applied to any area of the sanitary landfill which will not be utilized for further disposal of solid waste for more than two months. The cover shall be graded to allow surface water runoff.

d. The final cover shall be consistent with the proposed land use but in no event shall be less than 2 feet.

567—103.5(455B) Specific requirements for a sanitary landfill proposing to accept a specific type of solid waste.

103.5(1) *Plan requirements.* The plans for sanitary landfills proposing to accept only a specific type of solid waste shall include the following information in addition to that required by 567—Chapter 102 and subrule 103.2(1).

- a.* The source of the solid waste and a description of the process which produces it.
- b.* A detailed analysis of the solid waste to be deposited at the site, including such tests as may be required by the department to evaluate the potential impact of disposal of the solid waste on the environment if it is disposed in the manner described in the plans.
- c.* Engineering detailing how the site will be designed, constructed, and operated to protect ground and surface water resources.
- d.* If the information submitted in 103.5(1)“*b*” indicates that no danger of contamination of ground or surface waters exists, the director may waive any rule requiring analysis and definition of subsurface geology.

103.5(2) *Specific operating requirements for sanitary landfills proposing to accept a specific type of solid waste.* The operating requirements for a sanitary landfill accepting a specific type of solid waste will necessarily vary with the nature of the solid waste. Accordingly, no single standard of operation is practical. The applicant shall submit a plan of operation which incorporates the requirements of 567—Chapter 102 and subrule 103.2(2), and which proposes minimum standards to be maintained at the site for the following operating procedures. The department shall approve the proposed standards if it finds they will provide adequate protection of the environment. The sanitary landfill shall be operated in conformance with 567—Chapter 102, subrule 103.2(2), and the standards approved by the department.

- a.* Daily, intermediate, and final cover.
- b.* Number and duties of personnel.
- c.* Storage and preliminary processing of solid waste.
- d.* Safety procedures and equipment.
- e.* Operating equipment.
- f.* Buildings and shelter.

567—103.6(455B) Specific requirements for a sanitary landfill proposing to accept no solid waste other than municipal sewage sludge.

103.6(1) *Plan requirements.* The plans for sanitary landfills proposing to accept only sewage sludge shall include information required by 567—Chapter 102 and subrule 103.2(1) and the following:

- a.* The source of the sludge, a description of the process(es) which produce the sludge and a description of the sources and characteristics of the treatment plant influent.
- b.* Detailed analysis of the sludge to be disposed of at the site including:
 - (1) Total residue;
 - (2) Volatile residue;
 - (3) pH;
 - (4) Total nitrogen;*

- (5) Ammonia nitrogen (NH₃-N);*
- (6) Nitrate-nitrogen (NO₃-N);*
- (7) Total phosphorous;*
- (8) Potassium;*
- (9) The following metals:* Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Molybdenum (Mo), Nickel (Ni), Selenium (Se), and Zinc (Zn); and
- (10) Such other tests as are determined by the department to be necessary to establish the constituents and stability of the sludge.

*on a dry weight basis

The collection and preservation of samples shall be done by the highest grade operator at the plant producing the sludge, or the operator's designee. This shall be done in a manner and frequency approved by the director and intended to ensure that the sampling results are representative of the sludge being disposed.

Analyses shall be performed at a laboratory approved by the state hygienic laboratory. All analyses shall be performed in accordance with the methods described in "Methods for Chemical Analysis of Water and Wastes," 1974 (U.S. EPA) or "Standard Methods for the Examination of Water and Waste Water," 14th Edition, 1976. Alternate methods may be substituted only if acceptable to the state hygienic laboratory and approved by the department.

c. The detailed description of the disposal process required in 567—subrule 102.12(6) shall include:

- (1) Method of operation;
- (2) Daily and annual loading of the sludge and the significant components of the sludge as identified in the analyses of 103.6(1) "b"; and
- (3) Times of use (including durations and frequencies).

d. Information indicating how the operating requirements of 567—102.13(455B), 103.2(2) and 103.6(2) shall be met.

e. Engineering plans and reports detailing how the site will be designed, constructed, and operated to protect ground and surface water resources.

f. Proof of the applicant's ownership of the site or legal entitlement to use the site for the disposal of solid waste for the term of the permit for which application is made.

g. Such other information as is required by the executive director to determine the adequacy of the applicant's plan.

103.6(2) Operating requirements. Sanitary landfills accepting only sewage sludges shall be operated in conformance with 567—Chapter 102, subrule 103.2(2), and this subrule. Compliance with the surface disposal provision of federal regulations at 40 CFR Part 503, Subpart c, as adopted on February 19, 1993, is also required. The plan submitted shall detail how the sanitary landfill will comply with these requirements.

a. Sludge at the site shall be covered after each day of operation with a layer of at least 1 foot of earth. In no event shall sludge be exposed for more than 24 hours.

b. At least 2 feet of intermediate cover of earth shall be applied to any area of the site which will not be utilized for further disposal of sludge for more than one week. The cover shall be graded to allow surface water runoff without creating erosion or pollution problems.

c. The final cover shall be consistent with the proposed land use, but in no event shall be less than 2 feet.

d. Analyses of the sludge shall be performed and submitted to the department on a stipulated schedule and shall include such tests as required to confirm the constituents of the sludge.

103.6(3) *Time of compliance.* Publicly owned treatment works shall have until July 1, 1979, to comply with this rule.

567—103.7(455B) Coal combustion residue landfills. The following are the minimum requirements for siting, designing, and operating a solid waste landfill accepting only coal combustion residue. This rule stands alone and is not affected by references in other rules, except for the variance provision in 567—101.2(455B). “Coal combustion residue” means any solid waste produced by the burning of coal, either by itself or in conjunction with natural gas or other carbon-based fuels. It includes, but is not limited to, bottom ash, fly ash, slag and flue gas desulfurization system material generated by coal combustion and associated air pollution control equipment.

103.7(1) *Site requirements.*

a. The site cannot be a wetland, cannot be within a 100-year flood plain and cannot have any sink-holes or similar karst features.

b. No wastes shall be deposited within 300 feet of an inhabitable residence or a commercial enterprise, unless there is a written agreement with the property owner(s) allowing a lesser distance, or within 50 feet of the property boundary. The written agreement shall be filed with the county recorder for abstract of title purposes and a copy shall be submitted to the department.

c. All waste must be a minimum of 5 feet above the high groundwater table.

103.7(2) *Permit application requirements.* The application for a permit shall include the following:

a. A completed application Form 50.542-1542.

b. A copy of the letter from the waste management assistance division approving the comprehensive plan required by 567—101.5(455B).

c. Proof of legal entitlement to use the property as proposed.

d. A topographic map of the site and the adjacent area within 300 feet of the site, with contour intervals not exceeding 10 feet, that shows the location of existing improvements or alterations such as structures, wells, lakes, roads, drain tiles or similar items. The highest point of elevation on the site shall also be identified and given.

e. The results of a minimum of three soil borings for sites of ten acres or less with one additional boring for each additional three acres to determine the hydrogeologic conditions and establish the direction of groundwater flow throughout the site and the minimum depth to groundwater on the site.

f. An adequate number of representative groundwater sample results, minimum of three locations with one sample from each location, to fully characterize the groundwater quality at the site. The following are the analytical parameters that are required to characterize groundwater quality and establish a baseline for those parameters: arsenic, barium, beryllium, cobalt, copper, iron, lead, magnesium, manganese, selenium, zinc, chlorides, and sulfate. The analysis shall be for dissolved metals with filtering in the field.

g. Construction drawings and specifications of the improvements and alterations that are to take place on the site such as roads, structures, utilities, drainage ways, gates and fences.

h. A copy of the local siting approval required by Iowa Code section 455B.305A.

103.7(3) Design criteria.

a. The design of a coal combustion residue solid waste landfill shall contain a method for ensuring protection of the groundwater and surface water.

b. The design plan shall include a method of ash transportation that prevents blowing ash and a method for preventing blowing dust and air emissions when unloading the ash.

c. Surface runoff must be diverted from all active or closed areas, both during the active life of the facility and during the postclosure period.

d. The site must be secured with a fence and gate(s) to prevent unauthorized entry when unattended.

e. The site must have all-weather access roads adequate to accommodate all delivery vehicles and operating equipment.

f. The site must be fenced and gated in a manner that will prevent unauthorized deposition of wastes at the site.

103.7(4) Operating requirements.

a. An operation plan shall be prepared and submitted to the appropriate department field office prior to initiating operations. The plan, at a minimum, shall include:

(1) An identification of the area to be filled during the period for which a permit is being requested.

(2) The method(s) that will be utilized to prevent illicit municipal or putrescible solid wastes from being deposited as a result of mixing with authorized waste brought to the site.

(3) The frequency, extent and method of spreading and compacting the waste; the optimum layer thickness; and the size and slope of the operating face.

(4) A description of the operating procedures that will be followed when wastes are brought to the site.

(5) If removal of waste from the landfill for beneficial reuse is intended, that activity should be addressed in the original operation plan. If the permit holder decides to remove waste after completion of the original operation plan, the plan must be amended prior to removing any waste.

b. After the waste is deposited, it must be treated as necessary to control fugitive dust that would leave the site and to control erosion that would impact operations in the active fill area. If the methods used do not adequately control dust and erosion, the department may require site-specific controls including a soil cover.

c. A minimum of one down gradient monitoring well must be installed within one year of initiating operations. Additional wells may be required when it is apparent that more than one potential contaminant pathway exists. Monitoring wells will normally be placed within 50 feet of the waste boundary.

d. Quarterly sampling of all monitoring wells and analysis for the parameters specified in paragraph 103.7(2)“*f*” shall commence within one year of initiating operations for the purpose of establishing the average baseline concentrations for each well. Annual sampling of all monitoring wells for the parameters specified in paragraph 103.7(2)“*f*” shall commence within one year of completing the quarterly baseline monitoring. Additional sampling or a site assessment may be required by the department when there is an exceedance of any primary or secondary Maximum Contaminant Level (MCL) or the Health Advisory Level (HAL) of the Drinking Water Standards and Health Advisories of the federal Environmental Protection Agency. When an MCL or HAL does not exist for a parameter and a sample analysis exceeds the average value for that parameter for the most recent two years of data, the department will require the collection and analysis of a sample for three consecutive months. If the average result of those sample analyses equals or exceeds the value that required the monthly samples to be collected, the department may require a site assessment.

e. A report of the groundwater monitoring results shall be submitted to the department by the end of the first year’s operation and annually thereafter.

103.7(5) Closure/postclosure requirements.

a. One hundred eighty days prior to closure, the owner/operator shall submit a postclosure plan to the department. The plan shall list the date of closure, the actions that will be taken to close the site, the final site contours and final cover design, and the parties responsible for postclosure maintenance.

b. The final cover shall consist of not less than two feet of compacted soil and one foot of uncompacted soil capable of sustaining a growth of common grasses.

c. The slope of the landfill area after final closure shall be not less than 3 percent nor more than 25 percent.

d. A growth of common grasses shall be established on the final cover by the end of the first full growing season.

e. A minimum of one sample from each monitoring well shall be collected annually during the postclosure period and analyzed for the parameters specified in the permit. The results shall be included in the annual report.

f. After closure, an annual inspection of the site shall be conducted. Any differential settling, surface cracks, holes, erosion channels, or any interference with surface drainage shall be corrected by restoration to the original condition. A report on the findings and corrective actions taken shall be included in the annual report. These postclosure actions are required for a minimum of ten years following closure. The department may extend the monitoring and reporting period if it appears that continued maintenance and monitoring are warranted.

103.7(6) Permit renewal. The term for a permit to operate a solid waste landfill accepting only coal combustion residue waste shall be ten years, and the permit shall be renewable for a similar term.

This rule is intended to implement Iowa Code section 455B.304.

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